

Lewis Ling, Carleton University, took the S.E.M. pictures. I am grateful to all of these individuals and institutions for their generous assistance. The work has been supported by an operating grant from the National Research Council of Canada.

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SAWFLIES OF THE SUBFAMILY HETERARTHRIINAE IN SOUTH AMERICA (HYMENOPTERA: TENTHREDINIDAE)

DAVID R. SMITH

Systematic Entomology Laboratory, Agricultural Research Service, USDA<sup>1</sup>

ABSTRACT—A key is given to the 3 genera of Heterarthrinae that occur in South America. *Caliroa* O. Costa is represented by an introduced species, *C. cerasi* (L.) that occurs in Chile, Argentina, and Uruguay. *Brasinusa* Malaise is known from southern Brazil and possibly northern Argentina and includes *B. plaumanni* Malaise. *Notofenusia* Benson is found in Chile and southern Argentina, and 4 species from Chile and includes: *N. surosa* (Konow), *N. asorusa*, n. sp., *N. flinti*, n. sp., and *N. nema*, n. sp. *Notofenusia cognata* (Spinola), new combination, is also included, but the species cannot be placed.

The Heterarthrinae are poorly represented in the Neotropical Region and are found only in the southern section of South America. Three genera are known, and one, *Caliroa* O. Costa of the tribe Caliroini, is represented by only the introduced species *C. cerasi* (L.). The other 2 genera, *Brasinusa* Malaise and *Notofenusia* Benson of the tribe Fenusini, are very closely related to several Nearctic genera. All members of this subfamily in South America are small and black, the smallest of the family Tenthredinidae. Hosts are not known for the South American species, but all the North American species of Fenusini are leafminers in the larval stage.

Key to Genera of Neotropical Heterarthrinae

1. Vein 2A & 3A of forewing complete, connected to 1A by an anal crossvein  
     [Caliroini] ..... *Caliroa* O. Costa

<sup>1</sup>Mail address: c/o U.S. National Museum, Washington, D.C. 20560.

- Anal cell of forewing petiolate, basal section of vein 2A & 3A atrophied, only basal stub present which is either straight or curved up and meeting 1A to form a small basal anal cell [Fenusini] ..... 2
2. Tarsal claw bifid, with basal lobe; stub of vein 2A & 3A of forewing curved up and meeting 1A to form a small basal anal cell; antenna stout, its length not much more than head width ..... *Brasinusa* Malaise
- Tarsal claw simple, with basal lobe; stub of vein 2A & 3A of forewing straight; antenna slender, long, its length nearly twice width of head ..... *Notofenusia* Benson

## CALIROINI

*Caliroa* O. Costa

Type-species: *Caliroa scbetia* O. Costa. Monotypic.

*Caliroa cerasi* (L.)

This species was treated in detail in my revision of the Nearctic Heterarthrinae (Smith, 1971). It is nearly a cosmopolitan species by introduction and has been recorded from Chile, Argentina, and Uruguay in South America. The larvae feed on pear and other rosaceous plants and are often pests in orchards.

## FENUSINI

*Brasinusa* Malaise

*Brasinusa* Malaise, 1964. Ent. Tidskr. 85:35.

Type-species: *Brasinusa plaumanni* Malaise. Orig. desig.

Antenna stout, its length subequal to head width; 9-segmented; third segment twice length of fourth segment. Clypeus truncate; malar space absent. No prepectus. Tarsal claw bifid, with basal lobe. Vein 2A & 3A of forewing atrophied at base, only basal stub present which is curved up and meets 1A to form a small basal anal cell. Hindwing with radial cell open at apex; cells *Rs* and *M* both absent; anal cell present.

This genus is close to *Bidigitus* Smith, known only from California. *Bidigitus* and *Brasinusa* are the only 2 known genera of this tribe with bifid tarsal claws and a basal lobe. *Brasinusa* is distinct, however, by the presence of a basal anal cell in the forewing and stouter antennae. The genus includes only 1 species from Santa Catarina, Brazil and possibly Northern Argentina. I have seen 1 male specimen from Tucuman, Argentina which differs from *plaumanni* only by the slightly different shape of the harpe and valves of the genitalia. The differentiating characters are not sufficient at present to warrant describing it as new, and I am not including it in the distribution of *plaumanni*.

*Brasinusa plaumanni* Malaise

*Brasinusa plaumanni* Malaise, 1964. Ent. Tidskr. 85:36. ♀, ♂.

Female: Average length, 3.6 mm. All black except for each tibia which is some-

times brownish. Wings moderately, uniformly infuscated; veins and stigma black. Lancet as in fig. 7.

Male: Average length, 3.5 mm. Color as for female. Harpe and parapenis as in fig. 12; penis valve pointed at apex, fig. 13.

Distribution: Known only from Nova Teutonia, Santa Catarina, Brazil. I have seen specimens with the following collection dates: X-16-1949, X-22-1958, IV-10-1963, I-1966, II-1966, IV-13-1966, X-1969, II-1971, III-1971, IV-1971.

Type: At the Swedish Museum of Natural History, Stockholm. Type examined.

Discussion: The generic characters and genitalia of *plaumanni* as illustrated should distinguish this species from possible unknown species and from species of *Notofenusa*.

#### *Notofenusa* Benson

*Notofenusa* Benson, 1959. Proc. Roy. Entomol. Soc. London, Ser. B: Taxonomy 28:91. Type-species: *Scolioneura surosa* Konow. Orig. desig.

Antenna long and slender; 9-segmented; length about twice head width; third segment  $1\frac{1}{2}$  times length of fourth segment; apical 4 segments each longer than broad. Clypeus truncate; malar space absent; antennal crests distinct. No prepectus. Tarsal claw with 1 outer tooth and large acute basal lobe. Forewing with stub of vein 2A & 3A straight at apex. Hindwing with cell R open; cells Rs and M both absent; anal cell present, short and broad.

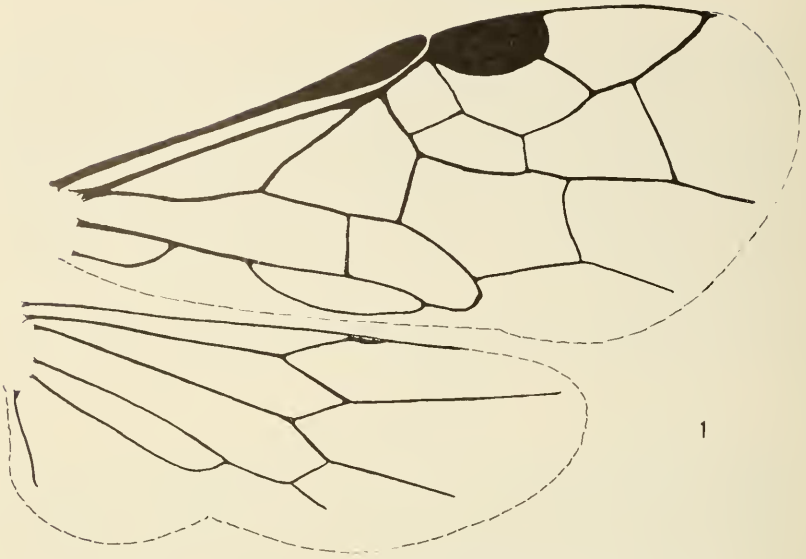
This genus most closely resembles the holarctic *Profenusa* Konow, but the longer and more slender antennae and more produced antennal crests will distinguish *Notofenusa*.

There are a number of species in this genus from central Chile south to Tierra del Feugo and southern Argentina. All are similar in size, external structure, and coloration and are difficult to distinguish. The genitalia of both sexes, however, provide good characters for species separation. The treatment below is based on females, because, unfortunately, the sexes could not be associated adequately. Though I examined several series which included both sexes from the same locality with the same collection dates, 2 or more species were represented in each series, and it was impossible to determine the correct association. The male genitalia do show good characters, and those of 2 of the forms are illustrated (fig. 14-17), but the problem of their correct identity will have to await further investigation.

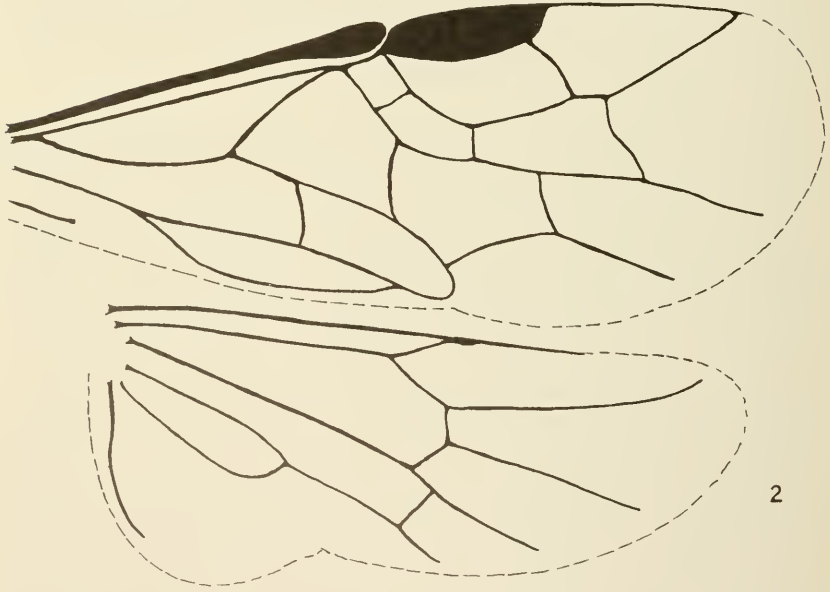
I saw only 1 specimen (a male) from Argentina (Bariloche, Rio Negro, Nov. 1926). It is similar to some males from Chile but cannot be identified at this time.

#### Key to Species of *Notofenusa*—Females

1. Lancet short, with about 12 serrulae; each serrula low, rounded, and symmetrical (fig. 8) ..... *flinti* Smith, n. sp.



1



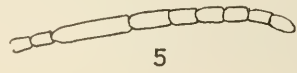
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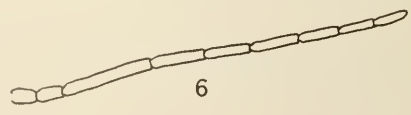
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6

- Lancet longer, with 15 or more serrulae; each serrula flat at apex or deeper and rounded at apex and asymmetrical ..... 2
- 2. Each serrula rounded at apex, with at least 3 anterior subbasal teeth (fig. 11) ..... *asorusa* Smith, n. sp.
- Each serrula flat at apex, at most with 1 anterior subbasal tooth (fig. 9, 10) ..... 3
- 3. About 15 serrulae, each with 1 anterior and 3 or 4 posterior subbasal teeth (fig. 10) ..... *surosa* (Konow)
- About 25 serrulae, each without anterior and with 1 posterior subbasal tooth (fig. 9) ..... *nema* Smith, n. sp.

*Notofennusa surosa* (Konow)

*Scolioneura surosa* Konow, 1905. Ztschr. System. Hym. Dipt. 5:162. ♀.

*Notofennusa surosa*: Benson, 1959. Proc. Roy. Entomol. Soc. London, Ser. B, Taxonomy 28:92.

Female: Average length, 3.8 mm. Antenna and head black; apex of each mandible reddish. Thorax black. Legs black with extreme apex of each femur, each tibia entirely, and each tarsus basally white, each tarsus usually infuscated and blacker toward apex. Abdomen and sheath black. Wings moderately, uniformly infuscated; veins and stigma black.

Antenna rather short, only 1½ times head width. Hindtarsus about ⅔ length of hindtibia. Sheath straight above, slightly rounded below and at apex. Lancet with about 15 serrulae; each serrula low, broad, flattened at apex, and with 1 anterior and 4 or 5 posterior subbasal teeth; serrulae on basal ½ of lancet sometimes without anterior subbasal tooth (fig. 10).

Male: Unknown.

Distribution:—CHILE: Valdivia, I-1924. Sierra de Nahuelbuta, W. of Angol, 1200 m. I-3-51. Crest, Sierra Nahuelbuta, W. of Angol, I-2-1951. El Coigo, Cord. Curico, Oct.-Nov. 1959. Pichinahuel, Cord. Nahuelbuta, Jan. 10, 10-20, 20-28, 1959. Las Cruces, Cord. Parral, October 1958. Lago Icalma, 13/17-I-1962. Las Trancas, Cord. Chillan, 1/11-XII-1964. Angol, 29 Oct. 1956.

Type: Konow's type is at the Institut für Pflanzenschutzforschung, Eberswalde, Germany, a female, labeled "Chile, Concepe., 9.1903, P. Herbst," "Coll. Konow," "Type," and the name label "*Scolioneura surosa* Konow, Chile." Type examined.

Discussion: This species is separated from *flinti* by the deeper and apically truncated serrulae of the lancet and shorter antennae, the antennae of *flinti* being at least twice the head width. Characters of the lancet must be used to separate *surosa* from the other 2 species; the lancet of *nema* has many more serrulae and lacks anterior subbasal teeth, and that of *asorusa* has the serrulae slightly deeper, rounded at their apices, and with more anterior subbasal teeth.

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Fig. 1, forewing and hindwing of *Brasinusa plaumanni*. Fig. 2, forewing and hindwing of *Notofennusa surosa*. Fig. 3, tarsal claw of *B. plaumanni*. Fig. 4, tarsal claw of *N. surosa*. Fig. 5, antenna of *B. plaumanni*. Fig. 6, antenna of *N. surosa*.

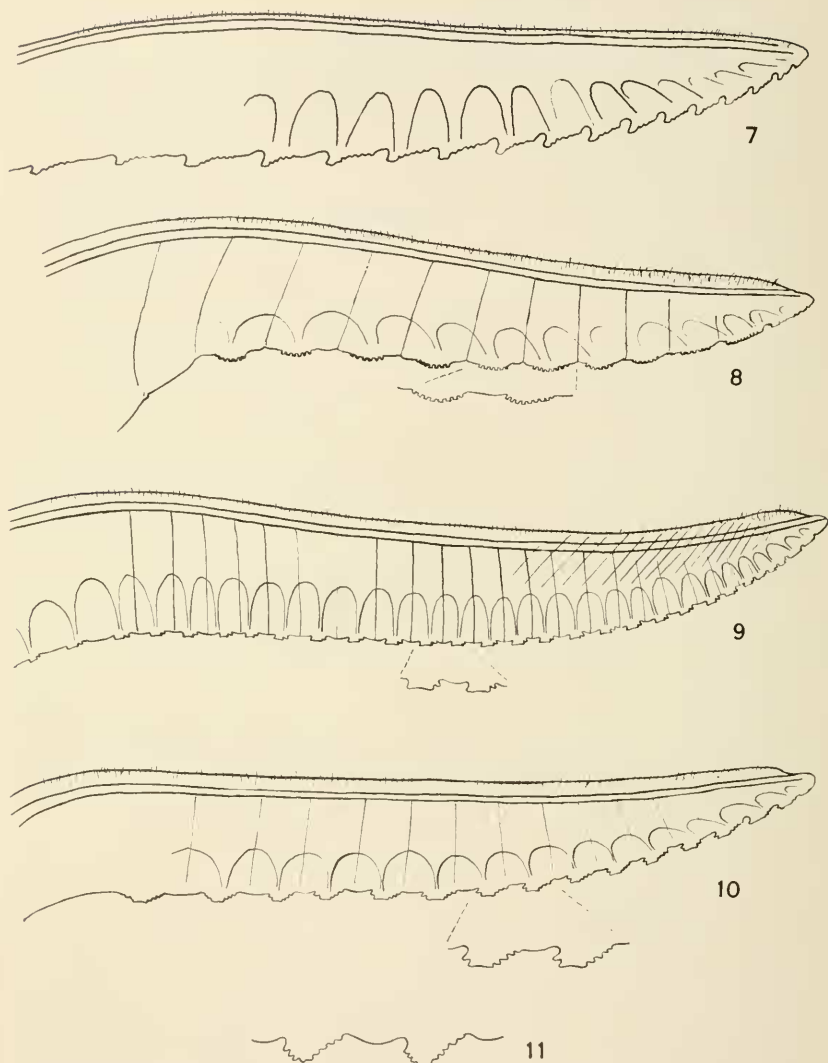


Fig. 7, Lance of *Brasinusa plaumanni*. Fig. 8, lance of *Notofenusa flinti* n. sp. Fig. 9, lance of *N. nema* n. sp. Fig. 10, lance of *N. surosa* n. sp. Fig. 11, serrulae of *N. asorusa* n. sp.

*Notofenusa asorusa* Smith, new species

fig. 11

Female: Average length, 3.5 mm. Identical to *surosa* (Konow) except for characters of the female lance as follows: about 15 serrulae; each serrula rounded

at apex, not flat as in *surosa* and with 3 or 4 anterior and 5 or 6 posterior sub-basal teeth (fig. 11); the serrulae are also slightly deeper than those of *surosa*.

Male: Unknown.

Holotype: Female, labeled "El Coigo, Chile, Cord. Curico, Oct.-Nov. 1959, Luis E. Pena." At the Illinois Natural History Survey.

Paratypes: CHILE: same data as for holotype (3 ♀♀). Las Cruces, Cord. Parral, October 1958, Luis E. Pena (7 ♀♀). Pichinahuel, Cord. Nahuelbuta, January 20-28, 1959, Luis E. Pena (1 ♀). 40 Km. E. of San Carlos, Nuble, XII-24-50, leg Ross and Michelbacher (1 ♀). 50 Km. E. of San Carlos, Nuble, XII-26-50, leg Ross and Michelbacher (1 ♀). Bio-Bio, El Abanico, XII-30-1950, leg Ross and Michelbacher (1 ♀). Nuble, 40 Km. E. of San Carlos, XII-23-1950, leg Ross and Michelbacher (1 ♀). At the Illinois Natural History Survey, California Academy of Sciences, and U.S. National Museum.

Discussion: It is unnecessary to describe this species more than above because of its similarity to *surosa* except for characters of the female lancet as stated. The species name is an arbitrary combination of letters and is to be treated as a noun.

*Notofenusa flinti* Smith, new species

fig. 8

Female: Average length, 3.6 mm. Antenna and head black; apex of each mandible reddish. Thorax black. Legs black with extreme apex of each femur and each tibia entirely whitish. Abdomen and sheath black. Wings moderately, uniformly infuscated; veins and stigma black.

Antenna long and slender, at least twice as long as head width. Hindtarsus slender, nearly as long as hindtibia. Sheath long, straight above and nearly straight below with obliquely truncated apex. Lancet short, with 12 serrulae, each serrula low and rounded with 7 or 8 coarse subbasal teeth (fig. 8).

Male: Unknown.

Holotype: Female, labeled "Chile: prov. Magallanes, Rio Las Minas, 10, 15 Jan. 1966, Flint and Cekalovic." U.S.N.M. Type no. 72353.

Paratypes: CHILE: same data as for holotype (5 ♀♀). Prov. Magallanes, Punta Arenas, 9-15 Jan. 1966, Flint and Cekalovic (1 ♀). Prov. Magallanes, Chor. Las Piedras, 11 Jan. 1966, Flint and Cekalovic (1 ♀). Prov. Magallanes, Rio Tres Brazos, 9-13 Jan. 1966, Flint and Cekalovic (1 ♀). In the U.S. National Museum.

Discussion: The lancet is quite unlike that of other species of *Notofenusa* having fewer serrulae and these low and rounded. The antennae and hind tarsi are longer and more slender than in other species of the genus, but *flinti* is difficult to determine on this basis unless other species are available for comparison. This species is named after one of the collectors, Oliver S. Flint, Jr.

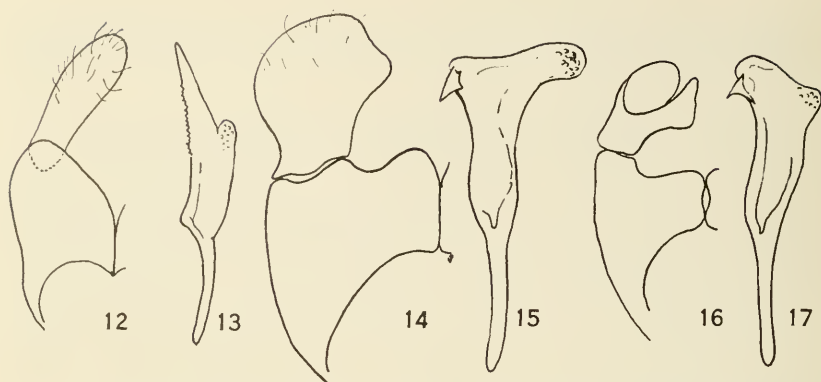


Fig. 12, Harpe and parapenis and, fig. 13, penis valve of *Brasinusa plaumanni*. Fig. 14, harpe and parapenis, and fig. 15, penis valve of *Notofenusia* sp. Fig. 16, harpe and parapenis, and fig. 17, penis valve of *Notofenusia* sp.

*Notofenusia nema* Smith, new species

fig. 9

Female: Average length, 3.6 mm. Head and antenna black; apex of each mandible reddish. Thorax black. Legs black with extreme apex of each femur and each tibia entirely whitish; inner surface of each tibia may be infuscated. Abdomen and sheath black. Wings moderately, uniformly infuscated; veins and stigma black.

Antenna slender, relatively short, about  $1\frac{1}{2}$  times head width. Hindtarsus stout, only about  $\frac{2}{3}$  length of hindtibia. Sheath straight above, rounded below and at apex. Lancet long, with about 25 serrulae, each serrula low, broad, flat at apex, without anterior subbasal teeth and with only 1 large posterior subbasal tooth; annuli parallel and close together (fig. 9).

Male: Unknown.

Holotype: Female, labeled "Pichinahuel, Chile, Cord. Nahuelbuta, January 20-28, 1959, Luis E. Pena." At the Illinois Natural History Survey.

Paratypes: CHILE: same data as for holotype (1 ♀). 40 km. E. of San Carlos, Nuble, XII-24-50, leg Ross and Michelbacher (1 ♀). El Coigo, Cord. Curico, Oct.-Nov. 1959, Luis E. Pena (1 ♀). Angol, 30 Dec. 1936, D. S. Bullock (1 ♀). At the Illinois Natural History Survey and California Academy of Sciences.

Discussion: Externally, this species is indistinguishable from *surosa* and *asorosa*; however, the lancet of *nema* is much longer, has more serrulae, and each serrula is flat and has only 1 subbasal tooth. The shorter antennae will help to separate this species from *flinti* in addition to the lancet characters. As devised, the species name is an arbitrary combination of letters and is to be treated as a noun.



*Notofenusa cognata* (Spinola), new combination

*Tenthredo cognata* Spinola, 1851. In Gay, Historia, fisica y politica de Chile, Zoologica, v. 6, p. 558.

This species must belong in *Notofenusa* because of its small size and coloration, and it may be one of the species described here. I was unable to locate the type, however, and because the classification of this genus is based on genitalia, the type will have to be examined for correct placement.

ACKNOWLEDGMENTS

The cooperation of the following has made this review possible: Per Inge Persson, Naturhistoriska Riksmuseum, Stockholm, Sweden; G. Morge, Institut für Pflanzenschutzforschung, Eberswalde, Germany; D. W. Webb, Illinois Natural History Survey, Urbana; and P. H. Arnaud, Jr., California Academy of Sciences, San Francisco.

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**A REVIEW OF KARSCHOMYIA FELT WITH DESCRIPTIONS OF SEVEN NEW NEARCTIC SPECIES (DIPTERA: CECIDOMYIIDAE)**

RAYMOND J. GAGNÉ

Systematic Entomology Laboratory, Agricultural Research Service, USDA<sup>1</sup>

ABSTRACT—*Karschomyia* Felt (Diptera: Cecidomyiidae) is redescribed and a key is given to the 10 Nearctic species. These are described and their genitalia are illustrated. The new species of *Karschomyia* described herein are **curiosa**, **ectopia**, **insolita**, **inuitata**, **mira**, **perissa**, and **praecipua**. The extra-Nearctic species are listed, with *elegans* Mamaev a new synonym of *ramosa* (Kieffer). *Karschomyia townsendi* Felt from Peru is transferred to *Coquillettomyia* Felt.

The genus *Karschomyia* Felt (Diptera: Cecidomyiidae: Cecidomyiidi) comprises a number of medium-sized, brown species which as adults are readily recognized by the transversely divided abdominal terga and sterna of segments II–VI. *Karschomyia* shares that char-

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<sup>1</sup> Mail address: c/o U.S. National Museum, Washington, D.C. 20560.